

B R E V I O R A

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NEW OR REDESCRIBED PELOMEDUSID SKULLS FROM THE TERTIARY OF AFRICA AND ASIA (TESTUDINES, PELOMEDUSIDAE)

1. *Dacquemys palcomorpha*, new genus, new species from the Lower Oligocene of the Fayum, Egypt.

BY ERNEST WILLIAMS

In 1912 E. Dacqué described a skull from the Lower Oligocene of the Fayum of Egypt which he referred, with doubt, to *Stereogenys libyca* Andrews. The skull, which is the property of the Staatliches Museum für Naturkunde in Stuttgart, has survived the war. Thanks to the kindness of the authorities in Stuttgart, and especially of Prof. F. Berckheimer and Dr. Karl Dietrich Adam, I have been able to re-examine it.

Re-examination confirms the excellence and accuracy of Dacqué's figures, but it also leaves no doubt that he failed to sufficiently appreciate the uniqueness of the specimen in certain regards. It is unquestionably a new genus of pelomedusid, which may be named and defined as follows:

DACQUEMYS, new genus

Diagnosis. A pelomedusid belonging to the Podocnemis group within the family and possessing the enlarged "carotid canal" and basioccipital-quadrate contact characteristic of that group but differing from the others of the group and from all other members of the family in the extensive squamosal-parietal contact.

Genotype. *Dacquemys palcomorpha*, new species.

The genotype is at present the only species.

DACQUEMYS PALEOMORPHA, new species

Type. No. 12645 in the paleontological collection of the Staatliches Museum für Naturkunde, Stuttgart, a skull without mandible.

Type locality. Diieh, Fayum of Egypt.

Horizon. Lower Oligocene.

Specific diagnosis. With the characters of the genus.

Description. A moderately elongate skull (estimated condylo-basal length 72mm.) of rather heptagonal shape with a completely covered temporal region and the orbits far forward, these and the nares concealed in dorsal view. No forehead groove. Frontals enter orbit broadly. Interorbital width relatively great. Well defined grooves bounding a nearly equilaterally triangular interparietal scute. Parietal scutes, well indicated by grooves on the bone, large and meeting for a considerable distance posterior to the interparietal scute. Jugal excluded from parietal by the postorbital which is relatively large. Squamosals and parietals in very broad contact. Temporal roof in consequence carried posterior to the cavum tympani. Squamosal in two planes: (1) a dorsal nearly horizontal arched surface joining the parietal paramedially and bordering laterally on the quadrate; (2) a ventral nearly vertical surface posterior to the quadrate, bearing a well-marked groove for the depressor mandibuli, and curving medially to meet the backward prong of the opisthotic which, as typically in pelomedusids, projects somewhat further posteriorly than the more dorsally placed backward process of the squamosal. Quadrate fully closed behind the columella. A narrow nearly horizontal opening in the cavum tympani leading posteriorly into a posterodorsal squamosal antrum. Below this is the tear-shaped columellar foramen through which the columella dorsally and the eustachian tube ventrally enter the middle ear. In front of the columellar opening (on one side only) is a very shallow depression which may represent the precolumellar fossa frequently present in pelomedusids and chelyids. The side of the temporal region apparently deeply emarginate, and the quadratojugal displaced dorsally. The orbits small, circular, far anterior, smaller than the cavum tympani. The maxilla rather narrow vertically. Indications of grooves marking off a "subocular" scute *sensu* Sieben-

rock, 1902, such as is present in some living species of *Podocnemis*. The premaxillae perhaps forming a hook; if so the hook eroded in the specimen. Nares much broader than high. Two strong ridges on the triturating surface of the maxilla, the ridges uniting anteriorly well short of the premaxilla. A deep premaxillary fossa, broken through in the specimen, implying a strongly hooked mandibular symphysis. The maxillae united behind the premaxillae for a significant distance in an incipient secondary palate. The vomerine region filled with crystal; probably no vomer was present. The ectopterygoid processes typically pleurodiran, moderately developed, and strongly inclined backward. The hypertrophied "carotid channel" smaller than in many *Podocnemis* but clearly specialized in the fashion peculiar to this group within the pelomedusids. The basisphenoid broad, sub-pentagonal, a long oblique lateral suture between quadrate and basioccipital. The occipital condyle missing in the specimen.

Discussion. It is very easy to show that the skull here named *Dacquemys palcomorpha* cannot belong to the genus *Stercogenys*. The type of *Stercogenys* is *S. cromeri* (U. Eocene of the Fayum) (Andrews, 1906), and the type of that species is a skull that differs more from *Dacquemys* than *Dacquemys* does from some of the species of *Podocnemis sensu lato*. I tabulate the major differences below.

<i>Stercogenys cromeri</i>	<i>Dacquemys palcomorpha</i>
Skull very broad, nearly as broad as long	Skull moderately elongate, one and one half times as long as wide
Squamosal not in contact with parietal	Squamosal in broad contact with parietal
Orbits exposed dorsally	Orbits not exposed dorsally
Secondary palate greatly developed, formed by a long median suture of the palatines, the maxillaries not meeting medially or meeting for a short distance only	Only an incipient secondary palate formed by the median union of the maxillaries behind the premaxillaries
Internal choanae therefore well behind the orbits	Internal choanae nearly at posterior level of orbits
Maxillary triturating surface without ridging	Maxillary with two ridges
Pterygoids (<i>vide</i> Andrews 1906) conceal basisphenoid ventrally	Basisphenoid exposed ventrally in normal fashion

The differences here summarized and also the great general difference in habitus go far beyond the amount that may be admitted within a genus of turtles. Dacqué was indeed aware of these differences (cf. p. 310 his paper) but he seems to have believed that the generic concept in turtles was founded on shells alone, and therefore that if a skull could be associated with a shell which appeared to be referable to a certain genus, the whole animal must receive the shell name, no matter how aberrant the features of the skull. This is, of course, incorrect. Not only is the type of *Stercogenys cromeri* the highly peculiar skull and not only are the shells which are referred to this genus so referred on grounds which are not conclusive, but even if this were not so, the generic concept in turtles as elsewhere is based on the total animal and not any arbitrarily chosen part of it. Generic distinction rests on the total grade of specialization.

Quite as surely as it cannot belong to *Stercogenys*, the skull here discussed cannot belong to *Podocnemis* or to any other pelomedusid genus in which the skull is known.

From *Shweboemys* (Swinton, 1939) it differs in much the same ways that it differs from *Stercogenys*. From *Podocnemis* in a restricted sense (type *P. expansa* and including only South American species), the Oligocene Egyptian skull is distinguished by the small, strictly lateral orbits and the very broad interorbital width as well as by the squamosal-parietal contact and the absence of a forehead groove.

From both *Erymnochelys* (type and only living species *E. madagascarcensis*) and *Peltocephalus* (type and only living species *P. dumeriliana*) it is distinguished by the double rather than single maxillary ridge, by the better developed secondary palate, by the shallowness or absence of a precolumellar fossa as well as by the squamosal-parietal contact and probably also by the lateral emargination of the temporal region.

From *Pelomedusa*, *Pelusios* and *Carteremys* (Williams, 1953), it is sufficiently distinguished by the covered temporal region and especially the squamosal-parietal contact, but from at least *Pelusios* and *Pelomedusa* it differs in the characters which it shares with the *Podocnemis* group of genera, to which it must, indeed, be referred — the enlarged "carotid channel" and the basioccipital-quadrato contact etc. From *Bothremys* (Hay, 1908)

it differs as radically as from *Stercogenys* e.g. in lacking the extraordinary pits in the maxillae so characteristic of *Bothremys*, in the much narrower skull, in the absence of a vomer, etc.

Other genera of fossil pelomedusids are known, but in none of these is the skull known, and there is no plausible reason for ascribing this skull to any of them. But while it is thus easy to show that to place the Egyptian skull in any described genus would be erroneous or probably erroneous on present knowledge, it is impossible to be sure that it does not belong to one of previously described Fayum species based on shells. I incline, indeed, to the opinion that it does belong to one of these species.

From the Lower Oligocene beds of the Fayum from which *Dacquemys* derives, three species of pelomedusid turtles have been described: *Podocnemis fajumensis* Andrews, *Stercogenys libyca* Andrews, and *Pelomedusa progaleata* v. Reinach.

If *Pelomedusa progaleata* (material re-examined by Dacqué, 1912) is correctly assigned and there appears to be sufficient reason to think that it is, *D. palcomorpha* cannot be synonymous with it, since the skulls in the two genera are so very different that they do not belong even in the same subsection of the Pelomedusidae.

Unless the *Dacquemys* skull belongs to some variety of shell still undiscovered, decision must then lie between *Podocnemis fajumensis* and *Stercogenys libyca*. This task is difficult, requiring a rather complex and tenuous argument.

The argument may be stated in this fashion:

The shell of *Podocnemis fajumensis* differs so little from that of Recent *Erymnochelys madagascarensis* that, considering the shell alone, the distinctness of the fossil species might be questioned. The skull of the fossil form might therefore be expected to be very like that of the Recent species, and in fact the *Dacquemys* skull is more similar to the skull of *Erymnochelys* or of related *Peltocephalus* than to any other known pelomedusid skulls. Since it seems evident that skulls in the *Podocnemis* sidebranch of the Pelomedusidae are subject to much more radical modification than the shells, which tend to be conservative and relatively difficult to distinguish, it is a possibility worth considering that the Dacqué skull may belong to "*Podocnemis*" *fajumensis*.

In the alternative case of *Stercogenys libyca* the shell which is the type of this species is clearly very similar to that referred to *S. cromeri*. The argument that the shells referred to *S. cromeri* really belong to that species is plausible even though not conclusive. Andrews (1906, p. 298) remarks: "Although in no case have the carapace and plastron been found associated with the skull in such a manner as to leave no doubt that they belong to the same individual, nevertheless the shell . . . may be regarded with reasonable certainty as belonging to the present species. In the first place, this form of shell, like the skull, is the commonest occurring in the Qasr-el-Sagha beds, and in the second place it differs widely from the shell of *Podocnemis*, the only other Pleurodiran genus found at this horizon." Accepting Andrews' interpretation of the situation, if *Stercogenys libyca* is really closely related to *S. cromeri*, it should have a skull to some degree resembling that of *S. cromeri*. The Dacqué skull is so very different from that of *S. cromeri* that it is very unlikely to be the skull of *S. libyca*.

Thus the Dacqué skull is unlikely to be that of *S. libyca* and might be that of *P. fajumensis*. But to assert the truth of the latter suggestion confidently would be a bold venture. In the next paper of this series I shall present additional evidence based on a skull from the Miocene of Moghara that this suggestion may possibly be true, but even with this addition the evidence will still be incomplete. It remains an unfortunate fact that with none of the pelomedusids of Egypt is there an unequivocal association of a skull and a shell. I have therefore described the species *paleomorpha* as new, preferring to indicate the present state of the evidence: that we have here a very distinct type of skull which may belong to either of two distinct shell types or possibly to a third unknown one.

Andrews (1906, p. 295) has described from the same beds with *Dacquemys paleomorpha*, *P. fajumensis* and *S. libyca* an anterior portion of mandible which he has referred to *P. fajumensis*. His comment on this element is as follows: "This mandible differs from that of *P. madagascarensis* in having a broader symphysis; the biting surface is also broader and is partially divided in two by a median ridge." Figure 1 is a photograph of this mandibular fragment made by Peter Green and published by permission of

the Trustees of the British Museum. It will be seen that the ridging of this mandible would fit well with the maxillary ridging of *Dacquemys palcomorpha*, but there is no strong hook at the mandibular symphysis such as seems to be implied by the deep premaxillary form of the skull. In this case, as in the previous one, only discovery of associated material can verify the reference to genus and species.



Fig. 1. Dorsal view of mandible referred by Andrews to *Podocnemis fajumensis*. BM (NH) R 3346, from the Lower Oligocene of the Fayum, Egypt. x1. Photograph reproduced by permission of the Trustees of the British Museum.

The photographs of the skull of *Dacquemys palcomorpha* were made by the Museum für Naturkunde in Stuttgart and I am very grateful to the authorities there for the privilege of reproducing them.

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